# CHAPTER III: MIND-BODY MEDICINE

## Hypnosis

One example of a kind of so-called alternative practice that has been around for more than 200 years is hypnosis. It was founded by Franz Anton Mesmer, a Viennese doctor who in the 18th century became very popular very quickly, and as soon as he did, he left his wife and family in Vienna and moved to Paris where he competed very successfully with the doctors of the day. If you sent every other patient to Mesmer or a French physician in the 18th century, medically ill patients, which group of patients do you think would do better— animal magnetism or French medicine? How many think the animal magnetism patients would do better? Raise your hands. How many think the French medicine patients would do better? Most of you think nobody would do well. You're right. France at the time was the world's leading exporter of leeches. Bloodletting was the major treatment. Unless you happened to have congestive heart failure or a rare blood disorder, you were more likely to be killed than helped by going to a doctor. Voltaire wrote to his brother after their father died, "We did everything we could to save father. We even sent the doctors away." So Mesmer became popular in part because he kept people away from doctors. Now we're in a different context now, but it's worth keeping that in mind. There are, however, dangers to animal magnetism, and here's one of them. Freud studied hypnosis. In fact, it was the beginning of psychoanalysis. Hypnosis is sort of like the oldest profession. Everybody's interested in it, but nobody wants to be seen in public with it. In fact, it is at the beginning of many very important movements, one of them psychoanalysis. Freud studied with Charcot, the great French neurologist, and his early theories of the unconscious involved hypnosis. One day he gave up those theories when a patient woke up from a trance. In his autobiography, he wrote "threw her arms around my neck, and I was relieved from a painful discussion by the entrance of a servant, but I was modest enough not to attribute this event to my own irresistible personal attractiveness." So Freud discovered transference and decided to stop using hypnosis and start free association. The reason there's a couch in psychoanalysis is that Freud was using it for hypnosis, and he didn't like people staring him the eye, so he

moved his chair behind the couch. Well, interestingly, at the end of his career—I happened to visit his last study, which was in London, after he'd been chased out of Austria by the Nazis—and in the sacred spot over the couch, where here he had an archeological drawing, he had a different drawing. It was Charcot inducing hypnotic catalepsy. So at the end of his career, he again became interested in the idea that, as he put it, "the pure gold of analysis might have to be alloyed with the baser metal of suggestion." Now there's another person whose story is similar in some ways. This woman suffered from an illness called spinal weakness, which meant that she had to be carried from room to room by her father. Even through her marriage and pregnancy, she persisted in having spinal weakness. She went to see a disciple of Mesmer's named Phineas Quimby who cured her of her spinal weakness with animal magnetism. She became very close with him; they corresponded. Some think they had an affair. She got a letter about 5 years later announcing his sudden death, and the next day, she slipped on the ice, re-injured her back, and went into a period of meditation in which she discovered that it was not animal magnetism that had cured her but the word of God. Anybody know who this is now? Yes, it's Mary Baker Eddy. So hypnosis was at the beginning of Christian Science, and I actually was visiting the Mother Church in Boston, which is quite a place, and this lady was very nice to me, showing me around until she found out I did hypnosis. Then she turned cold as ice, and I saw the lesson—upper right—ancient and modern necromancy, alias mesmerism and hypnotism, denounced. So to this day, you can't mention hypnosis around a Christian Scientist. So there's a long history. Ellen Berger called hypnosis the first western conception of a psychotherapy, and it won't go away despite repeated rejections because it's a really interesting phenomenon.

So let me show you a little bit about what it is and how we use it. Hypnosis is composed of 3 things: absorption; dissociation; and suggestibility. Being in a hypnotic state is something like looking through the telephoto lens in a camera. What you see you see with great detail but devoid of context. So it's intensely focused central concentration coupled with a suspension of peripheral awareness, or dissociation. So you put things outside of consciousness that would ordinarily be in consciousness. One example of this is in the papers now. Jessica Lynch, the 19-year-old American woman soldier, now apparently

has global amnesia for all of the events that occurred while she was captive. This is an example of this kind of traumatic dissociation, more extreme than in hypnosis. But she was conscious at the time, she knew what was happening, but right now she doesn't have easy access of this information to consciousness. So it happens in real life, especially in situations of trauma. The third component is suggestibility. You're not made into a robot when you're hypnotized, but in fact, you're less likely to critically judge and evaluate suggestions that are made. So you're more likely to do things that you otherwise wouldn't do. This sounds a little weird, but we've all had situations in life when we thought to ourselves, "It seemed like a good idea at the time." You wonder why on earth you did things. Well hypnosis is an extreme example of that because you're so focused on the central idea that you alter your perception of other things that are going on. Hypnotizability is not equally distributed. It's not an equal opportunity state. Some people are highly hypnotizable, some not at all. And hypnotizability in adult life is as stable as IQ. So if you're highly hypnotizable when you're 20, you're likely to be highly hypnotizable when you're 60. And if you're not hypnotizable when you're 20, you're not likely to be hypnotizable later on.

How can you use this ability? Well one way in which we've studied it, its effect on brain and on body, is in looking at pain control. This is a model from Ronald Melzack's work, showing that there are 2 factors that influence our pain experience. One is ascending input from the periphery, and one is descending input from the cortex, which can also modulate pain, as you see on this slide. I think you can see that the baby is the one who's getting the shot here, and the father is the one who's in pain. So this is a way of making it clear that the cortical component of pain is really the critical part, and that's where altering perception can be extremely helpful. In fact, we have evidence, and I'll show you several kinds of evidence, that when you alter your perception of pain, you actually change the way your brain processes perception.

This seems pretty strange, but let's do a little experiment. Right now, you're having sensations in your bottoms touching these wonderful chairs. Hopefully that was not foremost in your mind until I brought it to your attention. All of the time, we make these

decisions to focus on certain input and put other input that could be available to consciousness outside of conscious awareness. With hypnosis, you do that in a more extreme form. What you see here is an EEG. It's electrical activity recorded on the scalp. The red line is a normal EEG, where you see these 3 positive points, they're plotted down just to confuse people, at 100, 200, and 300 milliseconds after the onset of a shock that's administered to the wrist. It feels like snapping your finger on your wrist. What you see is that under hypnosis, when the same shocks are administered but the subject is hypnotized and told "your hand is in ice water; it's cool and numb," the brain responds less to these same stimuli. So here you see about 1/2 the P200 response and here 1/2 the P300 response. The brain is acting as though it is feeling less of a stimulus than it does. It's not that they feel it, but say, "Well, it didn't bother me as much, it actually feels different." In another study that we did—I did this in collaboration with Steve Coslin at Harvard—we took highly hypnotizable individuals and hypnotized them and put them in a PET scanner. We first identified the parts of the brain where color vision is processed, particularly the fusiform and lingual gyri. This is the back of the brain here, the occipital cortex, and this is the part where in these subjects and in other subjects color vision is processed. We then showed them a color grid in one condition, a black-and-white grid in another, and told them to reverse it. So when they were seeing the color grid, they thought it was black and white, and when they were seeing the black and white grid, they thought it was color. They were learning to flip it back and forth like this in hypnosis, and they were convinced that when they were shown black and white, they were seeing color; when they were shown color, they were seeing black and white. What we found was that in their brains, the blood flow in the color vision part of the brain acted as though it was being shown color when in fact it was being shown black and white. When the color was drained from a color image, the blood flow in the color area decreased. These were significant differences. So again, the brain is believing, it's seeing. When subjects thought they were seeing color, their brain acted as though it were seeing color in a very specific region of the brain that processes color. So it is clear in the somatosensory and the visual systems and in other systems that when you hypnotize someone to alter perception, the brain acts as though reality was different, as though it was processing this information differently. Similarly, we showed in a series of studies looking at event-

related potentials again, at EEG, that simple inattention—just ignoring something—gives you a very different pattern of brain activation from hypnotic obstruction. When you think that you can't see something, something's blocking your vision, you shut down activity in the occipital cortex, the back of the brain where vision is processed, whereas inattention is processed more in the front part of the brain. There's a story for that with hypnosis as well. Pierre Rainville and his group in Montreal studied this, and it shows 2 kinds of hypnotic effects. There's a part of the brain called the anterior cingulate gyrus. The cingulate gyrus is like a giant sea under the cortex and above the brainstem, and it has to do with focusing of attention. What Rainville showed is that if you hypnotize a group of subjects, tell them that a painful sensation won't bother them—not that it will feel different but that it won't bother them—you get activation of the anterior cingulate cortex. It's focusing of attention. However, if you hypnotize them and say you will feel less, that it won't hurt as much, then you get activity in the somatosensory cortex. You get a reduction in the somatosensory cortex. So there seems to be 2 parts of the brain involved in hypnosis. The part that focuses attention, the anterior cingulate, and the particular part of the sensory cortex that you're altering perception with. But in both cases, you can see palpable, measurable changes in brain activity related to hypnotic instruction. He says, "Be realistic Mrs. Figby. If you really had multiple personalities, would you be using this one?" I like this one, too: "Have your id adjusted for summer."

Now how do we use what we know about hypnosis' effect on the brain clinically? There are 2 primary ways. One is to reduce anxiety. Teaching people to float, to not tense up when they're dealing with a problem like pain, phobias, or other problems that tend to make people tense their bodies and in turn worry about their reaction more because they sense their bodies getting tense. Another is actual sensory alteration. What I'd like to do is show you a few studies in which these kinds of hypnotic techniques have been used effectively. First, in a randomized trial with metastatic breast cancer patients these are patients whose breast cancer has spread to other parts of their body—we showed that women taught a simple 5-minute self-hypnosis exercise at the end of their support groups wound up at the end of the year with 1/2 the pain that the control patients had on the same and very low amounts of medication. In all of these trials, I'm going to be talking

about randomized clinical trials. What this means is that the investigator, using a method like the tossing of a coin, assigns people to either get the treatment or not. If there's a difference in outcome, it isn't because certain kinds of people would choose certain kinds of treatments. They're comparable to begin with, and this is one of the mainstays of clinical research. You do the randomized trial in which you, not the patient, make the decision about whether or not they get the treatment you're studying. So in this case, we know that they were comparable to begin with and yet they had 1/2 the pain the control group did on the same meds.

This is a study conducted by Elvira Lang at Harvard; I collaborated with her in this study. It was published in the *Lancet* in 2000. She's an interventional radiologist. She cuts down into arteries, threads little cameras in the arteries, does selective ablation of parts of the liver that have metastatic disease, and visualizes arterial obstructions in the kidney. It's high-tech invasive medicine. She did a randomized trial of 240 patients, 3 arms. One group had standard care. They all had intravenous analgesia if they wanted it—they just pressed a button. One group had an empathic nurse sitting with them but not doing anything, and one group was taught the kind of self-hypnosis that I showed you. What Lang showed, and these again are highly significant differences, is that over time the standard care group gets worse and worse despite having access to plenty of medications. You see their pain scores are going through the roof. The empathic care group stays about the same, so they do okay but not great. The hypnosis group shows actual decreases in pain the longer the procedure goes. These are their anxiety scores, and I was actually getting worried that the hypnosis patients were dying because they had virtually no anxiety by the end of a couple of hours, whereas the control standard care patients were getting worse and worse. We had far fewer procedural complications—for example, having too low oxygen, having instability of pulse or blood pressure—in the hypnosis group. So there were far fewer complications from the procedure, and they were using less pain medication. This is not just a mind-brain effect; it's a mind-body effect. These people are having few complications in their bodies of the procedure. Perhaps the best part is that the procedures on average took 17 minutes less time to complete for the hypnosis group than for the standard care group. That's a long 17 minutes when you're

one of these subjects, and it saves money as well. So the hypnotic intervention was extremely effective, and Lang did another little study where she calculated that, including the cost of having the person doing the hypnosis, you save $338 per procedure using this technique. Is every hospital in the country using it? No. That's one of the problems we face in complementary medicine. We have to be holier than the Pope. We have to prove things scientifically, and even when we do, it's a long road from scientific knowledge to implementation.

Now here's one other little hypnosis study. This is my daughter's depiction of what I do. She says, "My dad hypnotizes people and makes them want to live longer." You see a particularly successful clinical example here. My daughter asks me, "Dad are you still using that drawing?" She did this in kindergarten. She's now a freshman at Stanford, so I get plenty of grief, but I say it's too good not to use.

We're doing a study with children actually, who have to receive what are called voiding cystourethrograms. They have to have a catheter inserted in their bladder once a year to see if there's reflux from the bladder up to the kidneys. If it continues, they have to have major surgery. The kids don't like this procedure. Imagine you're an 8-year-old girl and you have to have your legs pulled apart and have a stranger stick a catheter into your bladder. You can't anesthetize the children because they have to control when they will initiate urination. I was getting stories about wrestling matches with these little kids on the floor of the radiology suite. It was a horrible situation. So I started going down there. Hypnotizability peaks in the life cycle at the age of 8. All 8-year-olds are in trances all the time, as you know if you try to call them for dinner or something like that. But if they're focused on what they're scared of, it'll be a nightmare. On the other hand, I say, "Look, we're going to play a trick on the other doctors. Your body has to be here, but you don't. So we're going to go somewhere else." So I would train them to go to Disneyland, to go somewhere else, and I would then teach the mothers how to practice this with them the week before, so the mothers had something to do to deal with their helplessness as well. We had them rate how unhappy they were during the procedure using one of these standard scales where they point to the face, and what we found in a randomized

comparison is that children cried less during the procedure from the parents' reports and they had less extreme distress, particularly at the tough part, which is preparing and initiating the catheterization, which is where they fight the most. We found that the professionals, particularly the technicians, reported that it was much easier to do the procedure when the kids were learning the hypnosis than routine care. It took 20 minutes less time, and that's a really long 20 minutes for these kids. They got through much more comfortably, much more quickly, and so we're convinced, for children as well as adults, that hypnosis is helpful.

Here he's saying, "The way we treat a headache here is to divert your attention to something else." Now one more example about hypnosis before I turn to cancer is just to show you a clinical example that gives you an idea visually of how hypnosis affects the body as well as the mind. This was the hand of a bricklayer in full extension 2½ years after a compound fracture to his index finger. The insurance company was following him around and secretly filming him to prove that he was actually lying about the hand. They never could prove it. I wouldn't believe it from the patient, but it was in his medical records. They told him, "We're going to amputate either your index finger or your benefits, take your pick. But you'll never have a usable hand if we don't remove this finger." Bob Chase was a hand surgeon who, like all good surgeons, knows when not to operate, and he said, "Are you willing to try anything, even a psychiatrist?" The patient said, "Yes." "Even one who uses hypnosis?" The patient nodded again, and he was sent to me. I looked at him, and I said, "I don't know why your hand is like this, but I can see that you have muscle wasting and that you have contractures, your skin is poor. You need to build up circulation and effort there. I'm going to show you how to get better. I'm not interested in why you're like this. I want to help you get better." Then I said, "You're going to develop tremors in your hand," and his hand started to shake, and he sat there for 1/2 an hour in my office with the sweat pouring off his forehead. Now this is a guy who other doctors had said was not motivated to get better. The insurance company thought he was faking it to stay sick, and he had been earning a lot more than I was as an assistant professor when he was a bricklayer before this happened. He lost his home, and he lost his wife because he was unemployed for 2½ years. So the hand starts to shake. In 3

months, the patient had full extension of all the fingers except the originally broken index finger. Dr. Chase put a dynamic splint on that finger, and at the end of 11 months, the patient had virtually full extension of the hand. He came in one day with a 35-pound brick, which the secretary was afraid he was going to throw through the window. He wanted to prove to me he could now hold the brick and use a trowel. He put his union card on top of it. I signed it. He had to sue the insurance company to take him off disability. They now wouldn't believe that he was actually recovered. He now has full use of the hand. He can make a real fist. He's back at work, and once again, he's earning more money than I am. A lot of people think of hypnosis as taking away control, as making people into robots. When I would have him teach the medical students, he'd get impatient with me. He'd say, "Doc, when do I get to show them what I did?" He was proud of how he had rehabilitated himself. Twice a day for 30 minutes he did self-hypnosis for a year, and he got his hand working again. What you do is you teach people how to use this ability to take control of what's going on in their brain and what's going on in their body.

Why don't we use these things more in medicine? "I'm sorry Mr. McConnell, your insurance plan only provides for empathetic nodding and a saddened downward glance. There is a $200 co-pay for any additional words of compassion, not to exceed 40 words or 3 expressions of sympathy or condolence." All I can say is that I wish this was funny. I think in many ways our health care system is broken, and there are so many forces at play that demean health care professionals; the term provider turns my stomach. It's a demeaning term. It says that one doctor is as good as another. You don't need continuity of care. It fills our time with paperwork and phone calls instead of spending time with patients, and it's impairing our ability to provide the kind of care that our patients need.